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- GENZEL, R. Strong, Spatially Extended CO $7 \rightarrow 6$ Emission from Luminous Cloud Cores: W52 and DR 21. *D. T. Jaffe, R. Genzel, A. I. Harris, J. G. Lugten, G. J. Stacey, and J. Stutzki.* 344, 265, 136-C10 (1989)
- GHOSH, K. K. Observation of an He Outburst in the Be Star HR 4123. *K. K. Ghosh, K. M. V. Apparao, and S. P. Tarafdar.* 344, 437, 138-D1 (1989)
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- GLESENER, J. W. Accelerated Decay of $^{180}\text{Ta}^m$ and ^{176}Lu in Stellar Interiors through (γ, γ') Reactions. *J. J. Carroll, J. A. Anderson, J. W. Glesener, C. D. Eberhard, and D. B. Collins.* 344, 454, 138-E8 (1989)
- GOLDSTEIN, W. H. Resonant Excitation of $2p^33s$ and $2p^33p$ Levels in Fe XVII. *W. H. Goldstein, A. Osterheld, J. Oreg, and A. Bar-Shalom.* 344, L37, 140-D3 (1989)
- GÓRSKI, KRZYSZTOF. Cosmological Velocity Correlations: Observations and Model Predictions. *Krzysztof Górska, Marc Davis, Michael A. Strauss, Simon D. M. White, and Amos Yahil.* 344, 1, 133-A9 (1989)
- GOULD, ROBERT J. Direct Positon Annihilation and Positronium Formation in Thermal Plasmas. *Robert J. Gould.* 344, 232, 135-G9 (1989)
- GRASDALEN, GARY L. A Study of the Stellar Population in the Lynds 1641 Dark Cloud. I. The *IRAS* Catalog Sources (Abstract of Paper in 1989 October Suppl.). *Karen M. Strom, Geoffrey Newton, Stephen E. Strom, Robert L. Seaman, Luis Carrasco, Irene Cruz-Gonzalez, Alfonso Serrano, and Gary L. Grasdalen.* 344, 1057, 147-C10 (1989)
- GREENHOUSE, MATTHEW A. Molecular Gas, the Interstellar Medium, and Star Formation in S0 and Sa Galaxies. *Harley A. Thronson, Jr., Linda Tacconi, Jeffrey Kenney, Matthew A. Greenhouse, Michael Margulius, Lowell Tacconi-Garman, and Judith S. Young.* 344, 747, 143-E10 (1989)
- GRINDLAY, JONATHAN E. Outflow from the Outer Lagrangian Point: Observations and Models of 4U 2127 + 12 in M15. *Charles D. Bailyn, Michael R. Garcia, and Jonathan E. Grindlay.* 344, 786, 144-A10 (1989)
- GROSSMAN, SCOTT A. Gravitationally Lensed Images in Abell 370. *Scott A. Grossman and Ramesh Narayan.* 344, 637, 142-D2 (1989)
- GROVE, KJIRSTEN. The "WN + WC" Wolf-Rayet Stars MR 111 and GP Cep: Spectrum Binaries or Missing Links? *Philip Massey and Kjirsten Grove.* 344, 870, 145-A10 (1989)
- HALPERN, JULES P. Structure of Line-emitting Accretion Disks in Active Galactic Nuclei: Arp 102B. *Kaiyou Chen and Jules P. Halpern.* 344, 115, 134-D12 (1989)
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- HANDA, K. Molecular Gas Bar and Expanding Molecular Ring in the Nucleus of the Spiral Galaxy Maffei 2. *M. Ishiguro, R. Kawabe, K.-I. Morita, S. Okumura, Y. Chikada, T. Kasuga, T. Kanazawa, H. Iwashita, K. Handa, T. Takahashi, H. Kobayashi, Y. Murata, S. Ishizuki, and N. Nakai.* 344, 763, 143-G1 (1989)
- HARDY, EDUARDO. The Kinematics of the Small Magellanic Cloud from Its Field Carbon Stars. *Eduardo Hardy, Nicholas B. Suntzeff, and Marc Azopardi.* 344, 210, 135-E10 (1989)
- HARLAN, EUGENE. A Study of Excess H- α Emission in Chromospherically Active M Dwarf Stars. *Arthur Young, Andrew Skumanich, John R. Stauffer, Bernard W. Bopp, and Eugene Harlan.* 344, 427, 138-C5 (1989)
- HARRIS, A. I. Strong, Spatially Extended CO $7 \rightarrow 6$ Emission from Luminous Cloud Cores: W52 and DR 21. *D. T. Jaffe, R. Genzel, A. I. Harris, J. G. Lugten, G. J. Stacey, and J. Stutzki.* 344, 265, 136-C10 (1989)
- HARTMANN, L. Ultraviolet Spectroscopy of Pre-Main-Sequence Accretion Disks. *S. J. Kenyon, L. Hartmann, C. L. Imhoff, and A. Cassegrain.* 344, 925, 145-E9 (1989)
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- HAYASHIDA, N. see BOND, I. A., et al.
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- HEITHAUSEN, A. Carbon Monoxide (CO) in the Magellanic Irregular Galaxy NGC 55 and the $N(\text{H}_2)/W(\text{CO})$ Ratio in Irregular Galaxies. *R. J. Dettmar and A. Heithausen.* 344, L61, 148-C1 (1989)
- HEROLD, H. Radiative Transfer in Fast-moving Media: The Limit of the Diffusion Approximation. *A. Rebetsky, H. Herold, U. Kraus, T. Maile, H. Ruder, and K. Wolf.* 344, L33, 140-C13 (1989)
- HERRERA, L. Diffusion Processes in General Relativistic Radiating Spheres. *W. Barreto, L. Herrera, and N. O. Santos.* 344, 158, 135-A7 (1989)
- HO, PAUL T. P. Excess 10 Micron Emission in Extragalactic Nuclei. *Paul T. P. Ho, Jean L. Turner, Giovanni G. Fazio, and S. P. Willner.* 344, 135, 134-F8 (1989)

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- ILLINGWORTH, GARTH. Major and Minor Axis Kinematics of 22 Ellipticals. *Marijn Franx, Garth Illingworth, and Timothy Heckman.* 344, 613, 142-B3 (1989)
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- INGRAHAM, R. L. Ripple Structure in Degenerate Electron Gas-dominated Stars with Intense Magnetic Fields. *J. M. Wilkes and R. L. Ingraham.* 344, 399, 137-G12 (1989)
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- ISHIZUKI, S. Molecular Gas Bar and Expanding Molecular Ring in the Nucleus of the Spiral Galaxy Maffei 2. *M. Ishiguro, R. Kawabe, K.-I. Morita, S. Okumura, Y. Chikada, T. Kasuga, T. Kanazawa, H. Iwashita, K. Handa, T. Takahashi, H. Kobayashi, Y. Murata, S. Ishizuki, and N. Nakai.* 344, 763, 143-G1 (1989)
- IWASHITA, H. Molecular Gas Bar and Expanding Molecular Ring in the Nucleus of the Spiral Galaxy Maffei 2. *M. Ishiguro, R. Kawabe, K.-I. Morita, S. Okumura, Y. Chikada, T. Kasuga, T. Kanazawa, H. Iwashita, K. Handa, T. Takahashi, H. Kobayashi, Y. Murata, S. Ishizuki, and N. Nakai.* 344, 763, 143-G1 (1989)
- JACOBY, GEORGE H. Planetary Nebulae as Standard Candles. III. The Distance to M81. *George H. Jacoby, Robin Ciardullo, Holland C. Ford, and John Booth.* 344, 704, 143-B1 (1989)
- Planetary Nebulae as Standard Candles. IV. A Test in the Leo I Group. *Robin Ciardullo, George H. Jacoby, and Holland C. Ford.* 344, 715, 143-C2 (1989)
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- JAKIMIEC, J. Turbulent and Directed Plasma Motions in Solar Flares. *A. Fludra, J. R. Lemen, J. Jakimiec, R. D. Bentley, and J. Sylvester.* 344, 991, 146-C7 (1989)
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- KAHLER, S. W. Coronal Mass Ejections and Associated X-Ray Flare Durations. *S. W. Kahler, N. R. Sheeley, Jr., and M. Liggett.* 344, 1026, 146-F3 (1989)
- KAHN, S. M. X-Ray Spectroscopy of the Ultralsoft Transient 4U 1543 – 47. *H. van der Woerd, N. E. White, and S. M. Kahn.* 344, 320, 137-A7 (1989)
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- KANZAWA, T. Molecular Gas Bar and Expanding Molecular Ring in the Nucleus of the Spiral Galaxy Maffei 2. *M. Ishiguro, R. Kawabe, K.-I. Morita, S. Okumura, Y. Chikada, T. Kasuga, T. Kanazawa, H. Iwashita, K. Handa, T. Takahashi, H. Kobayashi, Y. Murata, S. Ishizuki, and N. Nakai.* 344, 763, 143-G1 (1989)
- KÄPPELER, F. $^7\text{Li}(n, \gamma)^8\text{Li}$ —Trigger Reaction to a Primordial r -Process? *M. Wiescher, R. Steininger, and F. Käppeler.* 344, 464, 138-F6 (1989)
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- KASUGA, T. Molecular Gas Bar and Expanding Molecular Ring in the Nucleus of the Spiral Galaxy Maffei 2. *M. Ishiguro, R. Kawabe, K.-I. Morita, S. Okumura, Y. Chikada, T. Kasuga, T. Kanazawa, H. Iwashita, K. Handa, T. Takahashi, H. Kobayashi, Y. Murata, S. Ishizuki, and N. Nakai.* 344, 763, 143-G1 (1989)
- KATO, S. Experimental Determination of the $^{19}\text{Ne}(p, \gamma)^{20}\text{Na}$ Reaction Rate and the Breakout Problem from the Hot CNO Cycle. *S. Kubono, H. Orihara, S. Kato, and T. Kajino.* 344, 460, 138-F1 (1989)
- KAWABE, R. Molecular Gas Bar and Expanding Molecular Ring in the Nucleus of the Spiral Galaxy Maffei 2. *M. Ishiguro, R. Kawabe, K.-I. Morita, S. Okumura, Y. Chikada, T. Kasuga, T. Kanazawa, H. Iwashita, K. Handa, T. Takahashi, H. Kobayashi, Y. Murata, S. Ishizuki, and N. Nakai.* 344, 763, 143-G1 (1989)
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- KENNEY, JEFFREY. Molecular Gas, the Interstellar Medium, and Star Formation in S0 and Sa Galaxies. *Harley A. Thronson, Jr., Linda Tacconi, Jeffrey Kenney, Matthew A. Greenhouse, Michael Margulis, Lowell Tacconi-Garman, and Judith S. Young.* 344, 747, 143-E10 (1989)
- KENNEY, JEFFREY D. P. The Effects of Environment on the Molecular and Atomic Gas Properties of Large Virgo Cluster Spirals. *Jeffrey D. P. Kenney and Judith S. Young.* 344, 171, 134-B7 (1989)
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- KIFUNE, T. *see* BOND, I. A., et al.
- KOBAYASHI, H. Molecular Gas Bar and Expanding Molecular Ring in the Nucleus of the Spiral Galaxy Maffei 2. *M. Ishiguro, R. Kawabe, K.-I. Morita, S. Okumura, Y. Chikada, T. Kasuga, T. Kanazawa, H. Iwashita, K. Handa, T. Takahashi, H. Kobayashi, Y. Murata, S. Ishizuki, and N. Nakai.* 344, 763, 143-G1 (1989)
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- KUBONO, S. Experimental Determination of the $^{19}\text{Ne}(p, \gamma)^{20}\text{Na}$ Reaction Rate and the Breakout Problem from the Hot CNO Cycle. *S. Kubono, H. Orihara, S. Kato, and T. Kajino.* 344, 460, 138-F1 (1989)
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- MOORE, R. L.** Propagating and Nonpropagating Compression Waves in an Isothermal Atmosphere with Uniform Horizontal Magnetic Field. *Z. E. Musielak, C.-H. An, R. L. Moore, and S. T. Suess*. 344, 478, 138-G10 (1989)
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- MORITA, K.-I.** Molecular Gas Bar and Expanding Molecular Ring in the Nucleus of the Spiral Galaxy Maffei 2. *M. Ishiguro, R. Kawabe, K.-I. Morita, S. Okumura, Y. Chikada, T. Kasuga, T. Kanazawa, H. Iwashita, K. Handa, T. Takahashi, H. Kobayashi, Y. Murata, S. Ishizuki, and N. Nakai*. 344, 763, 143-G1 (1989)
- MORRIS, SIMON L.** A Cooling Flow in a High-Redshift, X-Ray-selected Cluster of Galaxies. *Roberto Neschi, Isabella M. Gioia, Tommaso Maccacaro, Simon L. Morris, Giuseppe C. Perola, Rudolph E. Schild, and Anna Wolter*. 344, 104, 134-C11 (1989)
- MUMMA, MICHAEL J.** On the Identification of Formaldehyde in Halley's Comet. *Michael J. Mumma and Dennis C. Reuter*. 344, 940, 145-F11 (1989)
- MURAKAMI, K.** see BOND, I. A., et al.
- MURAKI, Y.** see BOND, I. A., et al.
- MURATA, Y.** Molecular Gas Bar and Expanding Molecular Ring in the Nucleus of the Spiral Galaxy Maffei 2. *M. Ishiguro, R. Kawabe, K.-I. Morita, S. Okumura, Y. Chikada, T. Kasuga, T. Kanazawa, H. Iwashita, K. Handa, T. Takahashi, H. Kobayashi, Y. Murata, S. Ishizuki, and N. Nakai*. 344, 763, 143-G1 (1989)
- MURRAY, STEPHEN D.** The Fragmentation of Proto-Globular Clusters. I. Thermal Instabilities: Erratum. *Stephen D. Murray and Douglas N. C. Lin*. 344, 1052, 147-C2 (1989) (Orig. paper in 339, 933, 63-C8)
- MUSIELAK, Z. E.** Propagating and Nonpropagating Compression Waves in an Isothermal Atmosphere with Uniform Horizontal Magnetic

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- Field. Z. E. Musielak, C.-H. An, R. L. Moore, and S. T. Suess. 344, 478, 138-G10 (1989)
- NAGANO, M. see BOND, I. A., et al.
- NAKAI, N. Molecular Gas Bar and Expanding Molecular Ring in the Nucleus of the Spiral Galaxy Maffei 2. M. Ishiguro, R. Kawabe, K.-I. Morita, S. Okumura, Y. Chikada, T. Kasuga, T. Kanazawa, H. Iwashita, K. Handa, T. Takahashi, H. Kobayashi, Y. Murata, S. Ishizuki, and N. Nakai. 344, 763, 143-G1 (1989)
- NAKAMURA, K. see BOND, I. A., et al.
- NAKAMURA, T. see BOND, I. A., et al.
- NARAYAN, RAMESH. Gravitationally Lensed Images in Abell 370. Scott A. Grossman and Ramesh Narayan. 344, 637, 142-D2 (1989)
- NEMIROFF, ROBERT J. The Probability of Arc Lensing by Clusters of Galaxies. Robert J. Nemiroff and Avishai Dekel. 344, 51, 133-E13 (1989)
- NESCI, ROBERTO. A Cooling Flow in a High-Redshift, X-Ray-selected Cluster of Galaxies. Roberto Nesci, Isabella M. Gioia, Tommaso Maccacaro, Simon L. Morris, Giuseppe C. Perola, Rudolph E. Schild, and Anna Wolter. 344, 104, 134-C11 (1989)
- NEUFELD, DAVID A. Fast Molecular Shocks. II. Emission from Fast Dissociative Shocks. David A. Neufeld and A. Dalgarno. 344, 251, 136-B8 (1989)
- NEUPERT, WERNER M. Transient Coronal Extreme Ultraviolet Emission before and during the Impulsive Phase of a Solar Flare. Werner M. Neupert. 344, 504, 139-C5 (1989)
- NEWMAN, WILLIAM I. Double Galaxy Redshifts and the Statistics of Small Numbers. William I. Newman, Martha P. Haynes, and Yervant Terzian. 344, 111, 134-D7 (1989)
- NEWTON, GEOFFREY. A Study of the Stellar Population in the Lynds 1641 Dark Cloud. I. The IRAS Catalog Sources (Abstract of Paper in 1989 October Suppl.). Karen M. Strom, Geoffrey Newton, Stephen E. Strom, Robert L. Seaman, Luis Carrasco, Irene Cruz-Gonzalez, Alfonso Serrano, and Gary L. Grasdalen. 344, 1057, 147-C10 (1989)
- NOMOTO, KEN'ICHI. Formation of Dust Grains in the Ejecta of SN 1987A. Takashi Kozasa, Hiroichi Hasegawa, and Ken'ichi Nomoto. 344, 325, 137-A13 (1989)
- Rayleigh-Taylor Instability and Mixing in SN 1987A. Toshikazu Ebisuzaki, Toshikazu Shigeyama, and Ken'ichi Nomoto. 344, L65, 148-C5 (1989)
- NORMAN, MICHAEL L. Low-Temperature Transonic Cooling Flows in Galaxy Clusters. Martin E. Sulkhanen, Jack O. Burns, and Michael L. Norman. 344, 604, 142-A8 (1989)
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- NOVEMBER, LAURENCE J. The Vertical Component of the Supergranular Convection. Laurence J. November. 344, 494, 139-B1 (1989)
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- OKUMURA, S. Molecular Gas Bar and Expanding Molecular Ring in the Nucleus of the Spiral Galaxy Maffei 2. M. Ishiguro, R. Kawabe, K.-I. Morita, S. Okumura, Y. Chikada, T. Kasuga, T. Kanazawa, H. Iwashita, K. Handa, T. Takahashi, H. Kobayashi, Y. Murata, S. Ishizuki, and N. Nakai. 344, 763, 143-G1 (1989)
- OPHER, R. Observational Limits on the Coronal Hole Flow Geometry in an Alfvén Wave-driven Solar Wind. V. Jatenco-Pereira and R. Opher. 344, 513, 139-D4 (1989)
- OREG, J. Resonant Excitation of $2p^33s$ and $2p^33p$ Levels in Fe XVII. W. H. Goldstein, A. Osterheld, J. Oreg, and A. Bar-Shalom. 344, L37, 140-D3 (1989)
- ORIHARA, H. Experimental Determination of the $^{19}\text{Ne}(p, \gamma)^{20}\text{Na}$ Reaction Rate and the Breakout Problem from the Hot CNO Cycle. S. Kubono, H. Orihara, S. Kato, and T. Kajino. 344, 460, 138-F1 (1989)
- OSTERHELD, A. Resonant Excitation of $2p^33s$ and $2p^33p$ Levels in Fe XVII. W. H. Goldstein, A. Osterheld, J. Oreg, and A. Bar-Shalom. 344, L37, 140-D3 (1989)
- PACINI, FRANCO. X-Rays from SN 1987A: Beneath the Radioactive Layers. Rino Bandiera, Franco Pacini, and Marco Salvati. 344, 844, 144-F10 (1989)
- PADMANABHAN, T. A Note on the Volume Occupied in Phase Space by a System of Gravitationally Interacting Particles. T. Padmanabhan. 344, 848, 144-G1 (1989)
- PALUMBO, G. G. C. Contributions of Low-Luminosity Sources to the X-Ray Background. M. Persic, G. De Zotti, L. Danese, G. G. C. Palumbo, A. Franceschini, E. A. Boldt, and F. E. Marshall. 344, 125, 134-E10 (1989)
- PAPALOIZOU, J. C. B. Nonaxisymmetric Instabilities in Thin Self-gravitating Rings and Disks. J. C. B. Papaloizou and D. N. C. Lin. 344, 645, 142-D10 (1989)
- PAPANASTASSIU, D. A. The Presence of ^{146}Sm in the Early Solar System and Implications for Its Nucleosynthesis. A. Prinzhofer, D. A. Papanastassiou, and G. J. Wasserburg. 344, L81, 148-D10 (1989)
- PARTRIDGE, B. A New Narrow-Line Seyfert 1 Galaxy: IRAS 1652 + 395. L. Bassani, M. J. Coe, M. A. Malkan, N. Mandolati, B. Partridge, and L. Spinoglio. 344, 726, 143-D2 (1989)
- PAYNE, DAVID G. Numerical Simulations of Magnetized Jets. Kevin R. Lind, David G. Payne, David L. Meier, and Roger D. Blandford. 344, 89, 134-B8 (1989)
- PEEBLES, P. J. E. Tracing Galaxy Orbits Back in Time. P. J. E. Peebles. 344, L53, 148-B5 (1989)
- PELLEGRINI, PAULO S. First Results from a Deeper Survey of a Southern Redshift Slice. L. Nicolaci Da Costa, Paulo S. Pellegrini, C. Willmer, and David W. Latham. 344, 20, 133-C3 (1989)
- PEROLA, G. C. Short Time Scale Variability of the BL Lacertae Object OJ 287 in the Near-Infrared (Abstract of Paper in 1989 October Suppl.). D. Lorenzetti, E. Massaro, G. C. Perola, and L. Spinoglio. 344, 1056, 147-C9 (1989)
- PEROLA, GIUSEPPE C. A Cooling Flow in a High-Redshift, X-Ray-selected Cluster of Galaxies. Roberto Nesci, Isabella M. Gioia, Tommaso Maccacaro, Simon L. Morris, Giuseppe C. Perola, Rudolph E. Schild, and Anna Wolter. 344, 104, 134-C11 (1989)
- PERSIC, M. Contributions of Low-Luminosity Sources to the X-Ray Background. M. Persic, G. De Zotti, L. Danese, G. G. C. Palumbo, A. Franceschini, E. A. Boldt, and F. E. Marshall. 344, 125, 134-E10 (1989)
- PESNELL, W. DEAN. Properties of Eötvös Spheres. W. Dean Pesnell. 344, 851, 144-G4 (1989)
- PHILLIPS, J. A. Interpulse Emission from Pulsars at 25 MHz. J. A. Phillips and A. Wolszczan. 344, L69, 148-C9 (1989)
- PHILLIPS, T. G. The Abundances of Atomic Carbon and Carbon Monoxide Compared with Visual Extinction in the Ophiuchus Molecular Cloud Complex. Margaret A. Frerking, Jocelyn Keene, Geoffrey A. Blake, and T. G. Phillips. 344, 311, 136-G10 (1989)
- PIERCE, MICHAEL J. An Absolute Calibration of the $L-\sigma$ and $L-\sigma-\Sigma$ Relations for Elliptical Galaxies and the Distance to the Virgo and Fornax Clusters. Michael J. Pierce. 344, L57, 148-B9 (1989)
- PLRIEDHORSKY, W. Observations of the X-Ray Transient 4U 0115 + 63: Erratum. D. Whitlock, D. Rousset-Dupré, and W. Plriedhorsky. 344, 1051, 147-C1 (1989) (Orig. paper in 338, 381, 37-F3)
- POTGIETER, M. S. A New Calculation of the Cosmic-Ray Antiproton Spectrum in the Galaxy and Heliospheric Modulation Effects on This Spectrum Using a Drift Plus Wavy Current Sheet Model. W. R. Webber and M. S. Potgieter. 344, 779, 144-A3 (1989)
- PRIEST, E. R. A Twisted Flux-Tube Model for Solar Prominences. I. General Properties. E. R. Priest, A. W. Hood, and U. Anzer. 344, 1010, 146-E1 (1989)
- PRINZHOFER, A. The Presence of ^{146}Sm in the Early Solar System and Implications for Its Nucleosynthesis. A. Prinzhofer, D. A. Papanastassiou, and G. J. Wasserburg. 344, L81, 148-D10 (1989)
- PROBST, RONALD. Possible Pleiades Members with $M = 0.07 M_{\odot}$: Identification of Brown Dwarf Candidates of Known Age, Distance, and Metallicity. John Stauffer, Donald Hamilton, Ronald Probst, George Rieke, and Mario Mateo. 344, L21, 140-B13 (1989)
- PULONE, L. Theoretical Models for Helium-burning Stars in Intermediate-Metallicity Globular Clusters. V. Castellani, A. Chieffi, and L. Pulone. 344, 239, 136-A3 (1989)
- QUASHNOCK, JEAN M. Magnetic Field Generation during the Cosmological QCD Phase Transition. Jean M. Quashnock, Abraham Loeb, and David N. Spergel. 344, L49, 148-B1 (1989)
- RADICK, RICHARD R. Coronal Activity-Rotation Relations for Lower-Main-Sequence Stars. Andrea K. Dobson and Richard R. Radick. 344, 907, 145-C13 (1989)
- RAGA, A. C. Collimation of Stellar Winds by Nonadiabatic De Laval Nozzles. A. C. Raga and J. Cantó. 344, 404, 138-A5 (1989)
- RAMATY, REUVEN. Relativistic Electron Transport and Bremsstrahlung Production in Solar Flares. James A. Miller and Reuven Ramaty. 344, 973, 146-B3 (1989)
- RAMELLA, MASSIMO. Groups of Galaxies in the Center for Astrophysics Redshift Survey. Massimo Ramecca, Margaret J. Geller, and John P. Huchra. 344, 57, 133-F7 (1989)
- RASIO, FREDERIC A. Solving the Vlasov Equation in General Relativity. Frederic A. Rasio, Stuart L. Shapiro, and Saul A. Teukolsky. 344, 146, 134-G7 (1989)
- REBETSKY, A. Radiative Transfer in Fast-moving Media: The Limit of the Diffusion Approximation. A. Rebetsky, H. Herold, U. Kraus, T. Maile, H. Ruder, and K. Wolf. 344, L33, 140-C13 (1989)

- REICHMANN, E. J. Ultraviolet Events Observed in Active Regions. I. Observations and Scenario. *J. M. Fontenla, E. Tandberg-Hanssen, E. J. Reichmann, and Sharon Filipowski.* 344, 1034, 146-G1 (1989)
- REUTER, DENNIS C. On the Identification of Formaldehyde in Halley's Comet. *Michael J. Mumma and Dennis C. Reuter.* 344, 940, 145-F11 (1989)
- REYNOLDS, R. J. Probable Detection of H_a Emission from a Very High Velocity Cloud in Cetus. *A. S. Kutyrev and R. J. Reynolds.* 344, L9, 140-B1 (1989)
- RICKARD, LEE J. On the Nature of the Molecular Cores in High-Latitude Cirrus Clouds. I. A Survey of H₂CO (2 Centimeter), C₂H₂, and HC₃N. *B. E. Turner, Lee J. Rickard, and Lan-ping Xu.* 344, 292, 136-F2 (1989)
- RIEKE, G. H. Ionization of the Mass-Loss Wind of the M Supergiant IRS 7 by the Ultraviolet Flux in the Galactic Center. *G. H. Rieke and M. J. Rieke.* 344, L5, 140-A11 (1989)
- RIEKE, GEORGE. Possible Pleiades Members with $M = 0.07 M_{\odot}$. Identification of Brown Dwarf Candidates of Known Age, Distance, and Metallicity. *John Stauffer, Donald Hamilton, Ronald Probst, George Rieke, and Mario Mateo.* 344, L21, 140-B13 (1989)
- RIEKE, M. J. Ionization of the Mass-Loss Wind of the M Supergiant IRS 7 by the Ultraviolet Flux in the Galactic Center. *G. H. Rieke and M. J. Rieke.* 344, L5, 140-A11 (1989)
- ROBERTS, J. A. A Detailed Study of the Remnant of Nova GK Persei and Its Environs. *E. R. Seauquist, M. F. Bode, D. A. Frail, J. A. Roberts, A. Evans, and J. S. Albinson.* 344, 805, 144-C1 (1989)
- ROUSSEL-DUPRÉ, D. Observations of the X-Ray Transient 4U 0115 + 63: Erratum. *L. Whitlock, D. Roussel-Dupré, and W. Ptak.* 344, 1051, 147-C1 (1989) (Orig. paper in 338, 381, 37-F3)
- RUDER, H. Radiative Transfer in Fast-moving Media: The Limit of the Diffusion Approximation. *A. Rebetsky, H. Herold, U. Kraus, T. Maile, H. Ruder, and K. Wolf.* 344, L33, 140-C13 (1989)
- SAGE, L. J. Detection of CO Emission from S0 Galaxies. *L. J. Sage and J. M. Wrobel.* 344, 204, 135-E3 (1989)
- SAGE, LESLIE J. CO Emission from NGC 5195. *Leslie J. Sage.* 344, 200, 135-D12 (1989)
- SAITO, T. *see* BOND, I. A., et al.
- SAKATA, M. *see* BOND, I. A., et al.
- SALVATI, MARCO. X-Rays from SN 1987A: Beneath the Radioactive Layers. *Rino Bandiera, Franco Pacini, and Marco Salvati.* 344, 844, 144-F10 (1989)
- SANTOS, N. O. Diffusion Processes in General Relativistic Radiating Spheres. *W. Barreto, L. Herrera, and N. O. Santos.* 344, 158, 135-A7 (1989)
- SATO, H. *see* BOND, I. A., et al.
- SCHILD, RUDOLPH E. A Cooling Flow in a High-Redshift, X-Ray-selected Cluster of Galaxies. *Roberto Neschi, Isabella M. Gioia, Tommaso Maccacaro, Simon L. Morris, Giuseppe C. Perola, Rudolph E. Schild, and Anna Wolter.* 344, 104, 134-C11 (1989)
- SCHWARZ, HUGO E. He 2-104: A Symbiotic Proto-Planetary Nebula? *Hugo E. Schwarz, Colin Aspin, and Julie H. Lutz.* 344, L29, 140-C8 (1989)
- SEAMAN, ROBERT L. A Study of the Stellar Population in the Lynds 1641 Dark Cloud. I. The IRAS Catalog Sources (Abstract of Paper in 1989 October Suppl.). *Karen M. Strom, Geoffrey Newton, Stephen E. Strom, Robert L. Seaman, Luis Carrasco, Irene Cruz-Gonzalez, Alfonso Serrano, and Gary L. Grasdalen.* 344, 1057, 147-C10 (1989)
- SEAQUIST, E. R. A Detailed Study of the Remnant of Nova GK Persei and Its Environs. *E. R. Seauquist, M. F. Bode, D. A. Frail, J. A. Roberts, A. Evans, and J. S. Albinson.* 344, 805, 144-C1 (1989)
- SELLGREN, K. Absorption Features in the 3 Micron Spectra of Protostars. *Robert G. Smith, K. Sellgren, and Alan T. Tokunaga.* 344, 413, 138-B2 (1989)
- SERRANO, ALFONSO. A Study of the Stellar Population in the Lynds 1641 Dark Cloud. I. The IRAS Catalog Sources (Abstract of Paper in 1989 October Suppl.). *Karen M. Strom, Geoffrey Newton, Stephen E. Strom, Robert L. Seaman, Luis Carrasco, Irene Cruz-Gonzalez, Alfonso Serrano, and Gary L. Grasdalen.* 344, 1057, 147-C10 (1989)
- SHAPIRO, PAUL R. On the Dust Grain Origin of the Cosmic Submillimeter Background. *B. T. Draine and Paul R. Shapiro.* 344, L45, 148-A10 (1989)
- SHAPIRO, STUART L. Solving the Vlasov Equation in General Relativity. *Frederick A. Rasio, Stuart L. Shapiro, and Saul A. Teukolsky.* 344, 146, 134-G7 (1989)
- SHEELEY, N. R., JR. Coronal Mass Ejections and Associated X-Ray Flare Durations. *S. W. Kahler, N. R. Sheeley, Jr., and M. Liggett.* 344, 1026, 146-F3 (1989)
- SHIBATA, S. *see* BOND, I. A., et al.
- SHIGEYAMA, TOSHIKAZU. Rayleigh-Taylor Instability and Mixing in SN 1987A. *Toshiyuki Ebisuzaki, Toshiyuki Shigeyama, and Ken'ichi Nomoto.* 344, L65, 148-CS (1989)
- SHIMA, M. *see* BOND, I. A., et al.
- SHIMIZU, H. M. *see* BOND, I. A., et al.
- SKUMANICH, ANDREW. A Study of Excess H-a Emission in Chromospherically Active M Dwarf Stars. *Arthur Young, Andrew Skumanich, John R. Stauffer, Bernard W. Bopp, and Eugene Harlan.* 344, 427, 138-C5 (1989)
- SMITH, DEAN F. Nonlinear Effects in Fast Solar Flare Proton Acceleration by Magnetohydrodynamic Turbulence. *Dean F. Smith and Stephen H. Brecht.* 344, 1004, 146-D6 (1989)
- SMITH, HARDING E. Damped Lyman-Alpha Absorption by Disk Galaxies with Large Redshifts. III. Intermediate-Resolution Spectroscopy. *David A. Turnshek, Arthur M. Wolfe, Kenneth M. Lanzetta, Frank H. Briggs, Ross D. Cohen, Craig B. Foltz, Harding E. Smith, and Belinda J. Wilkes.* 344, 567, 141-E7 (1989)
- SMITH, MYRON A. Transients in the He I $\lambda 6678$ Line of λ Eri (B2e): Magnetic Quasi-Cycles? (Abstract of Paper in 1989 October Suppl.). *Myron A. Smith.* 344, 1060, 147-C13 (1989)
- SMITH, ROBERT G. Absorption Features in the 3 Micron Spectra of Protostars. *Robert G. Smith, K. Sellgren, and Alan T. Tokunaga.* 344, 413, 138-B2 (1989)
- SNEDEN, CHRISTOPHER. A Search for Lithium-rich Giant Stars (Abstract of Paper in 1989 October Suppl.). *Jeffery A. Brown, Christopher Sneden, David L. Lambert, and Edward Dutcher.* 344, 1058, 147-C11 (1989)
- SPENCER, M. *see* BOND, I. A., et al.
- SPERGEL, DAVID N. Magnetic Field Generation during the Cosmological QCD Phase Transition. *Jean M. Quashnock, Abraham Loeb, and David N. Spergel.* 344, L49, 148-B1 (1989)
- SPINOGLO, L. A New Narrow-Line Seyfert 1 Galaxy: IRAS 1652 + 395. *L. Bassani, M. J. Coe, M. A. Malkan, N. Mandelsoff, B. Partridge, and L. Spinoglio.* 344, 726, 143-D2 (1989)
- Short Time Scale Variability of the BL Lacertae Object OJ 287 in the Near-Infrared (Abstract of Paper in 1989 October Suppl.). *D. Lorenzetti, E. Massaro, G. C. Perola, and L. Spinoglio.* 344, 1056, 147-C9 (1989)
- STACEY, G. J. Strong, Spatially Extended CO 7 → 6 Emission from Luminous Cloud Cores: W52 and DR 21. *D. T. Jaffe, R. Genzel, A. J. Harris, J. G. Lugten, G. J. Stacey, and J. Stutzki.* 344, 265, 136-C10 (1989)
- STATLER, THOMAS S. Problems in Determining the Surface Density of the Galactic Disk. *Thomas S. Statler.* 344, 217, 135-F5 (1989)
- STAUFFER, JOHN. Possible Pleiades Members with $M = 0.07 M_{\odot}$: Identification of Brown Dwarf Candidates of Known Age, Distance, and Metallicity. *John Stauffer, Donald Hamilton, Ronald Probst, George Rieke, and Mario Mateo.* 344, L21, 140-B13 (1989)
- STAUFFER, JOHN R. A Study of Excess H-a Emission in Chromospherically Active M Dwarf Stars. *Arthur Young, Andrew Skumanich, John R. Stauffer, Bernard W. Bopp, and Eugene Harlan.* 344, 427, 138-C5 (1989)
- STEININGER, R. $^7\text{Li}(n,\gamma)^8\text{Li}$ —Trigger Reaction to a Primordial n -Process? *M. Wiescher, R. Steininger, and F. Käppeler.* 344, 464, 138-F6 (1989)
- STOREY, J. R. *see* BOND, I. A., et al.
- STRAUSS, MICHAEL A. Cosmological Velocity Correlations: Observations and Model Predictions. *Krzysztof Górska, Marc Davis, Michael A. Strauss, Simon D. M. White, and Amos Yahil.* 344, 1, 133-A9 (1989)
- STROM, KAREN M. A Study of the Stellar Population in the Lynds 1641 Dark Cloud. I. The IRAS Catalog Sources (Abstract of Paper in 1989 October Suppl.). *Karen M. Strom, Geoffrey Newton, Stephen E. Strom, Robert L. Seaman, Luis Carrasco, Irene Cruz-Gonzalez, Alfonso Serrano, and Gary L. Grasdalen.* 344, 1057, 147-C10 (1989)
- STROM, STEPHEN E. A Study of the Stellar Population in the Lynds 1641 Dark Cloud. I. The IRAS Catalog Sources (Abstract of Paper in 1989 October Suppl.). *Karen M. Strom, Geoffrey Newton, Stephen E. Strom, Robert L. Seaman, Luis Carrasco, Irene Cruz-Gonzalez, Alfonso Serrano, and Gary L. Grasdalen.* 344, 1057, 147-C10 (1989)
- STUTZKI, J. Strong, Spatially Extended CO 7 → 6 Emission from Luminous Cloud Cores: W52 and DR 21. *D. T. Jaffe, R. Genzel, A. J. Harris, J. G. Lugten, G. J. Stacey, and J. Stutzki.* 344, 265, 136-C10 (1989)
- SUESS, S. T. Propagating and Nonpropagating Compression Waves in an Isothermal Atmosphere with Uniform Horizontal Magnetic Field. *Z. E. Musielak, C.-H. An, R. L. Moore, and S. T. Suess.* 344, 478, 138-G10 (1989)
- SULKANEN, MARTIN E. Low-Temperature Transonic Cooling Flows in Galaxy Clusters. *Martin E. Sulkhanen, Jack O. Burns, and Michael L. Norman.* 344, 604, 142-A8 (1989)

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- SUNTZEFF, NICHOLAS B. The Kinematics of the Small Magellanic Cloud from Its Field Carbon Stars. *Eduardo Hardy, Nicholas B. Suntzeff, and Marc Azzopardi.* 344, 210, 135-E10 (1989)
- SVENSSON, ROLAND. Absorption of Gamma Rays and Gamma Rays at Cosmological Redshifts. *Andrzej A. Zdziarski and Roland Svensson.* 344, 551, 141-D4 (1989)
- SWADE, DARYL A. Radio Wavelength Observations of the L134N Molecular Core (Abstract of Paper in 1989 October Suppl.). *Daryl A. Swade.* 344, 1057, 147-C10 (1989)
- SYLWESTER, J. Turbulent and Directed Plasma Motions in Solar Flares. *A. Fludra, J. R. Lemen, J. Jakimiec, R. D. Bentley, and J. Sylwester.* 344, 991, 146-C7 (1989)
- SZALAY, ALEXANDER S. Three-Point Correlations of Galaxy Clusters. *Gábor Tóth, Joseph Hollósi, and Alexander S. Szalay.* 344, 75, 134-A6 (1989)
- TACCONI, LINDA. Molecular Gas, the Interstellar Medium, and Star Formation in S0 and Sa Galaxies. *Harley A. Thronson, Jr., Linda Tacconi, Jeffrey Kenney, Matthew A. Greenhouse, Michael Margulis, Lowell Tacconi-Garman, and Judith S. Young.* 344, 747, 143-E10 (1989)
- TACCONI, LINDA J. The Distribution of the Interstellar Medium in the Scd Galaxy NGC 6946. II. The CO Data (Abstract of Paper in 1989 October Suppl.). *Linda J. Tacconi and Judith S. Young.* 344, 1056, 147-C9 (1989)
- TACCONI-GARMAN, LOWELL. Molecular Gas, the Interstellar Medium, and Star Formation in S0 and Sa Galaxies. *Harley A. Thronson, Jr., Linda Tacconi, Jeffrey Kenney, Matthew A. Greenhouse, Michael Margulis, Lowell Tacconi-Garman, and Judith S. Young.* 344, 747, 143-E10 (1989)
- TAKAHASHI, T. Molecular Gas Bar and Expanding Molecular Ring in the Nucleus of the Spiral Galaxy Maffei 2. *M. Ishiguro, R. Kawabe, K.-I. Morita, S. Okumura, Y. Chikada, T. Kasuga, T. Kanzawa, H. Iwashita, K. Handa, T. Takahashi, H. Kobayashi, Y. Murata, S. Ishizuki, and N. Nakai.* 344, 763, 143-G1 (1989)
- TANDBERG-HANSEN, E. Ultraviolet Events Observed in Active Regions. I. Observations and Scenario. *J. M. Fontenla, E. Tandberg-Hansen, E. J. Reichmann, and Sharon Filipowski.* 344, 1034, 146-G1 (1989)
- TANIMORI, T. *see* BOND, I. A., et al.
- TAPIA, SANTIAGO. The Orbital Inclination of Cygnus XR-1 Measured Polarimetrically. *Joseph F. Dolan and Santiago Tapia.* 344, 830, 144-E7 (1989)
- TARAFDAR, S. P. Observation of an H α Outburst in the Be Star HR 4123. *K. K. Ghosh, K. M. V. Apparao, and S. P. Tarafdar.* 344, 437, 138-D1 (1989)
- X-Ray Observations of Planetary Nebulae with the EXOSAT Satellite. *Krishna M. V. Apparao and S. P. Tarafdar.* 344, 826, 144-E1 (1989)
- TERZIAN, YERVANT. Double Galaxy Redshifts and the Statistics of Small Numbers. *William I. Newman, Martha P. Haynes, and Yervant Terzian.* 344, 111, 134-D7 (1989)
- TESHIMA, M. *see* BOND, I. A., et al.
- TEUKOLSKY, SAUL A. Solving the Vlasov Equation in General Relativity. *Frederic A. Rasio, Stuart L. Shapiro, and Saul A. Teukolsky.* 344, 146, 134-G7 (1989)
- THOMPSON, RODGER I. Optically Thick Infrared CO Emission in WL 16. *Rodger I. Thompson and Buell T. Januzzi.* 344, 799, 144-B9 (1989)
- THONRON, HARLEY A., JR. Molecular Gas, the Interstellar Medium, and Star Formation in S0 and Sa Galaxies. *Harley A. Thronson, Jr., Linda Tacconi, Jeffrey Kenney, Matthew A. Greenhouse, Michael Margulis, Lowell Tacconi-Garman, and Judith S. Young.* 344, 747, 143-E10 (1989)
- TIELENS, A. G. G. M. The Correlation of C II 158 Micron and CO ($J = 1-0$) Line Emission. *Mark G. Wolfe, David Hollenbach, and A. G. G. M. Tiels.* 344, 770, 143-G8 (1989)
- The Infrared Emission Bands. II. A Spatial and Spectral Study of the Orion Bar. *J. D. Bregman, L. J. Allamandola, A. G. G. M. Tiels, T. R. Geballe, and F. C. Witteborn.* 344, 791, 144-B1 (1989)
- Mid-Infrared Spectra of WC 9 Stars: The Composition of Circumstellar and Interstellar Dust. *M. Cohen, A. G. G. M. Tiels, and J. D. Bregman.* 344, L13, 140-B5 (1989)
- TOFFOLATTI, L. Discrete Source Contributions to Small-Scale Anisotropies of the Microwave Background. *A. Franceschini, L. Toffolatti, L. Danese, and G. De Zotti.* 344, 35, 133-D8 (1989)
- TOKUNAGA, ALAN T. Absorption Features in the 3 Micron Spectra of Protostars. *Robert G. Smith, K. Sellgren, and Alan T. Tokunaga.* 344, 413, 138-B2 (1989)
- TORII, S. *see* BOND, I. A., et al.
- TÓTH, GÁBOR. Three-Point Correlations of Galaxy Clusters. *Gábor Tóth, Joseph Hollósi, and Alexander S. Szalay.* 344, 75, 134-A6 (1989)
- TUCHMAN, Y. Supernova 1987A: The Evolution from Blue to Red. *Y. Tuchman and J. Craig Wheeler.* 344, 835, 144-F1 (1989)
- TUOHY, I. R. A Spectroscopic, Photometric, and X-Ray Study of the DQ Herculis System 1H0542 - 407. *D. A. H. Buckley and I. R. Tuohy.* 344, 376, 137-F1 (1989)
- TURNER, B. E. On the Nature of the Molecular Cores in High-Latitude Cirrus Clouds. I. A Survey of H₂CO (2 Centimeter), C₃H₂, and HC₃N. *B. E. Turner, Lee J. Rickard, and Lan-ping Xu.* 344, 292, 136-F2 (1989)
- TURNER, JEAN L. Excess 10 Micron Emission in Extragalactic Nuclei. *Paul T. P. Ho, Jean L. Turner, Giovanni G. Fazio, and S. P. Willner.* 344, 135, 134-F8 (1989)
- TURNSHEK, DAVID A. A Search for Molecular Hydrogen and Dust in the $z = 2.796$ Damped Ly α Absorber toward Q1337 + 113. *Kenneth M. Lanzetta, Arthur M. Wolfe, and David A. Turnshek.* 344, 277, 136-D13 (1989)
- Damped Lyman-Alpha Absorption by Disk Galaxies with Large Redshifts. III. Intermediate-Resolution Spectroscopy. *David A. Turnshek, Arthur M. Wolfe, Kenneth M. Lanzetta, Frank H. Briggs, Ross D. Cohen, Craig B. Foltz, Harding E. Smith, and Belinda J. Wilkes.* 344, 567, 141-E7 (1989)
- UCHINO, K. *see* BOND, I. A., et al.
- VAN DER WOERD, H. X-Ray Spectroscopy of the Ultraluminous Transient 4U 1543 - 47. *H. van der Woerd, N. E. White, and S. M. Kahn.* 344, 320, 137-A7 (1989)
- WALLERSTEIN, GEORGE. Line Identifications in Stars of Spectral Type SC (Abstract of Paper in 1989 October Suppl.). *George Wallerstein.* 344, 1060, 147-C13 (1989)
- WASSERBURG, G. J. The Presence of ¹⁴⁶Sm in the Early Solar System and Implications for Its Nucleosynthesis. *A. Prinzhofen, D. A. Papanastassiou, and G. J. Wasserburg.* 344, L81, 148-D10 (1989)
- WATASE, Y. *see* BOND, I. A., et al.
- WEBER, W. R. A New Calculation of the Cosmic-Ray Antiproton Spectrum in the Galaxy and Heliospheric Modulation Effects on This Spectrum Using a Drift Plus Wavy Current Sheet Model. *W. R. Weber and M. S. Potgieter.* 344, 779, 144-A3 (1989)
- WEINTRAUB, DAVID A. Measurements of Keplerian Rotation of the Gas in the Circumstellar Disk around T Tauri. *David A. Weintraub, C. R. Masson, and B. Zuckerman.* 344, 915, 145-D13 (1989)
- WEST, MICHAEL J. Groups of Galaxies and Large-Scale Structure. *Michael J. West.* 344, 535, 141-C1 (1989)
- WHEELER, J. CRAIG. Supernova 1987A: The Evolution from Blue to Red. *Y. Tuchman and J. Craig Wheeler.* 344, 835, 144-F1 (1989)
- WHITE, N. E. X-Ray Spectroscopy of the Ultraluminous Transient 4U 1543 - 47. *H. van der Woerd, N. E. White, and S. M. Kahn.* 344, 320, 137-A7 (1989)
- WHITE, SIMON D. M. Cosmological Velocity Correlations: Observations and Model Predictions. *Krzysztof Gorski, Marc Davis, Michael A. Strauss, Simon D. M. White, and Amos Yahil.* 344, 1, 133-A9 (1989)
- WHITLOCK, L. Reanalysis of the 1973 Outburst of the X-Ray Transient V0332 + 53. *L. Whitlock.* 344, 371, 137-E9 (1989)
- Observations of the X-Ray Transient 4U 0115 + 63: Erratum. *L. Whitlock, D. Roussel-Dupré, and W. Priedhorsky.* 344, 1051, 147-C1 (1989) (Orig. paper in 338, 381, 37-F3)
- WIDING, K. G. Abundance Variations in the Outer Solar Atmosphere Observed in Skylab Spectroheliograms. *K. G. Widing and U. Feldman.* 344, 1046, 147-B6 (1989)
- WIESCHER, M. ⁷Li(n, γ)⁸Li - Trigger Reaction to a Primordial r-Process? *M. Wiescher, R. Steininger, and F. Käppeler.* 344, 464, 138-F6 (1989)
- WILKES, BELINDA J. Damped Lyman-Alpha Absorption by Disk Galaxies with Large Redshifts. III. Intermediate-Resolution Spectroscopy. *David A. Turnshek, Arthur M. Wolfe, Kenneth M. Lanzetta, Frank H. Briggs, Ross D. Cohen, Craig B. Foltz, Harding E. Smith, and Belinda J. Wilkes.* 344, 567, 141-E7 (1989)
- WILKES, J. M. Ripple Structure in Degenerate Electron Gas-dominated Stars with Intense Magnetic Fields. *J. M. Wilkes and R. L. Ingraham.* 344, 399, 137-G12 (1989)
- WILLMER, C. First Results from a Deeper Survey of a Southern Redshift Slice. *L. Nicolaci Da Costa, Paulo S. Pellegrini, C. Willmer, and David W. Latham.* 344, 20, 133-C3 (1989)
- WILLNER, S. P. Excess 10 Micron Emission in Extragalactic Nuclei. *Paul T. P. Ho, Jean L. Turner, Giovanni G. Fazio, and S. P. Willner.* 344, 135, 134-F8 (1989)
- WILLSON, ROBERT F. Radio Emission from Quiescent Solar Filaments at 91.6 Centimeter Wavelength. *Kenneth R. Lang and Robert F. Willson.* 344, L73, 148-C14 (1989)

- Time-correlated Bursts from Widely Separated Solar Active Regions at 91.6 Centimeter Wavelength. *Kenneth R. Lang and Robert F. Willson.* 344, L77, 148-D5 (1989)
- WITTEBORN, F. C. The Infrared Emission Bands. II. A Spatial and Spectral Study of the Orion Bar. *J. D. Bregman, L. J. Allamandola, A. G. G. M. Tielens, T. R. Geballe, and F. C. Witteborn.* 344, 791, 144-B1 (1989)
- WOLF, K. Radiative Transfer in Fast-moving Media: The Limit of the Diffusion Approximation. *A. Rebetsky, H. Herold, U. Kraus, T. Maile, H. Ruder, and K. Wolf.* 344, L33, 140-C13 (1989)
- WOLFE, ARTHUR M. A Search for Molecular Hydrogen and Dust in the $z = 2.79$ Damped Ly α Absorber toward Q1337 + 113. *Kenneth M. Lanzetta, Arthur M. Wolfe, and David A. Turnshek.* 344, 277, 136-D13 (1989)
- Damped Lyman-Alpha Absorption by Disk Galaxies with Large Redshifts. III. Intermediate-Resolution Spectroscopy. *David A. Turnshek, Arthur M. Wolfe, Kenneth M. Lanzetta, Frank H. Briggs, Ross D. Cohen, Craig B. Foltz, Harding E. Smith, and Belinda J. Wilkes.* 344, 567, 141-E7 (1989)
- WOLFIRE, MARK G. The Correlation of C II 158 Micron and CO ($J = 1-0$) Line Emission. *Mark G. Wolfire, David Hollenbach, and A. G. G. M. Tielens.* 344, 770, 143-G8 (1989)
- WOLFSON, RICHARD. Current Sheet Formation in a Sheared Force-free Magnetic Field. *Richard Wolfson.* 344, 471, 138-G1 (1989)
- WOLSZCZAN, A. Interpulse Emission from Pulsars at 25 MHz. *J. A. Phillips and A. Wolszczan.* 344, L69, 148-C9 (1989)
- WOLTER, ANNA. A Cooling Flow in a High-Redshift, X-Ray-selected Cluster of Galaxies. *Roberto Nesci, Isabella M. Gioia, Tommaso Maccacaro, Simon L. Morris, Giuseppe C. Perola, Rudolph E. Schild, and Anna Wolter.* 344, 104, 134-C11 (1989)
- WOODHAMS, M. D. see BOND, I. A., et al.
- WROBEL, J. M. Detection of CO Emission from S0 Galaxies. *L. J. Sage and J. M. Wrobel.* 344, 204, 135-E3 (1989)
- WU, KINWAH. Cyclotron Spectra from Inhomogeneous Accretion Columns. II. Polarization. *Kinwah Wu and G. Chanmugam.* 344, 889, 145-C1 (1989)
- Thermal Cyclotron Absorption Coefficients (Abstract of Paper in 1989 October Suppl.). *G. Chanmugam, P. E. Barrett, Kinwah Wu, and M. W. Courtney.* 344, 1059, 147-C12 (1989)
- XU, LAN-PING. On the Nature of the Molecular Cores in High-Latitude Cirrus Clouds. I. A Survey of H₂CO (2 Centimeter), C₃H₂, and HC₃N. *B. E. Turner, Lee J. Rickard, and Lan-ping Xu.* 344, 292, 136-F2 (1989)
- YAHIL, AMOS. Cosmological Velocity Correlations: Observations and Model Predictions. *Krzesztof Górska, Marc Davis, Michael A. Strauss, Simon D. M. White, and Amos Yahil.* 344, 1, 133-A9 (1989)
- YAMAMOTO, Y. see BOND, I. A., et al.
- YANG, W.-H. Expansion of Solar-Terrestrial Low- β Plasmoid. *W.-H. Yang.* 344, 966, 146-A10 (1989)
- YOCK, P. C. M. see BOND, I. A., et al.
- YOUNG, ARTHUR. A Study of Excess H- α Emission in Chromospherically Active M Dwarf Stars. *Arthur Young, Andrew Skumanich, John R. Stauffer, Bernard W. Bopp, and Eugene Harlan.* 344, 427, 138-C5 (1989)
- YOUNG, JUDITH S. The Effects of Environment on the Molecular and Atomic Gas Properties of Large Virgo Cluster Spirals. *Jeffrey D. P. Kenney and Judith S. Young.* 344, 171, 134-B7 (1989)
- Molecular Gas, the Interstellar Medium, and Star Formation in S0 and Sa Galaxies. *Harley A. Thronson, Jr., Linda Tacconi, Jeffrey Kenney, Matthew A. Greenhouse, Michael Margulis, Lowell Tacconi-Garman, and Judith S. Young.* 344, 747, 143-E10 (1989)
- The Distribution of the Interstellar Medium in the Scd Galaxy NGC 6946. II. The CO Data (Abstract of Paper in 1989 October Suppl.). *Linda J. Tacconi and Judith S. Young.* 344, 1056, 147-C9 (1989)
- YUDA, T. see BOND, I. A., et al.
- ZDZIARSKI, ANDRZEJ A. Absorption of Gamma Rays and Gamma Rays at Cosmological Redshifts. *Andrzej A. Zdziarski and Roland Svensson.* 344, 551, 141-D4 (1989)
- ZUCKERMAN, B. Measurements of Keplerian Rotation of the Gas in the Circumbinary Disk around T Tauri. *David A. Weintraub, C. R. Masson, and B. Zuckerman.* 344, 915, 145-D13 (1989)

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